dale, who states that there is no support whatever to the story told by a Chinaman to Dr. Wallace as to the flying powers of *Rhacophorus nigropalmatus*, or a closely allied form. Consequently, it may be hoped that the fable of the flying frog will disappear from zoological literature—but errors of this sort die hard. Mr. Annandale notices that certain kinds of Malay reptiles are much more brilliantly coloured in the immature than in the adult condition, and likewise records that the giant cobra (*Naia bungarus*) is the object of mimicry by a harmless snake of the genus Zamenis, typified by the Indian rat-snake.

Of the invertebrates included in the first section Colonel Swinhoe treats of the moths, and shows in the course of his descriptions that these insects do not display that division into a lowland and a mountain type so noticeable in the case of the birds. Land-planarians, of which one out of the three specimens procured indicates a new species, are described by Mr. F. F. Laidlaw. The six species of parasitic Diptera collected—the first recorded from Malacca—are discussed by Dr. Speiser. Tiger-beetles are treated of by Mr. H. C. Robinson. Finally, dragon-flies fall to the lot of Mr. Laidlaw, who tells us that in respect of these insects the fauna of the Malay Peninsula, as contrasted with its Burmese representative, is much more closely related to that of Sumatra.

Part ii. includes seven articles (together with an appendix), of which the first four are devoted to invertebrates. Mr. W. E. Collinge describes the land molluscs, among which the discovery of one remarkable Bornean genus in the Malay Peninsula is of considerable interest. Rhynchota, of which only a portion of the collection is described, fall to the lot of Mr. W. L. Distant, who records several new forms, illustrated in a coloured plate. Dr. D. Sharp contributes an interesting account of the remarkable and gigantic insects of the genus Helicopris. In the vertebrate section, Mr. G. A. Boulenger contributes a list of the freshwater fishes; while Mr. J. Johnston reports on the marine representatives of that group. Especially interesting is a species of mud-skipper of the genus Periophthalmus described by the latter gentleman as new, owing to a marked difference in its habits from other species. Finally, Dr. C. W. Andrews contributes a note on a tooth of *Elephas namadicus*, in the course of which he makes the apparently incorrect statement that the species in question occurs in the Upper Siwaliks, whereas it is confined, in India, to the gravels of the Narbada Valley.

While fully appreciating the manner in which this section of the work has been carried out, we may suggest that it would much facilitate reference if in future, instead of the serial title appearing in the headlines of both pages of the text, the titles of the different articles were given on the right-hand pages.

In the supplement Messrs. Annandale and Robinson furnish, in the form of an itinerary, a brief general account of the districts visited, which cannot fail to be of great value to future travellers. In addition to several photographs of scenery, it contains an excellent coloured map of the middle portion of the Malay Peninsula.

R. L.

FIRM FOUNDATIONS.

Vorlesungen über projektive Geometrie. By Prof. F. Enriques. Deutsche Ausgabe von Dr. H. Fleischer. Pp. xiv+374. (Leipzig: Teubner, 1903.)

Encyklopädie der Elementar-Mathematik. Von H. Weber und J. Wellstein. Erster Band. Elementare Algebra und Analysis. Von H. Weber. Pp. 447. (Leipzig: Teubner, 1903.) Price 8 marks.

THE fact that Prof. Enriques's book has been translated from the original Italian into German at the instigation of Prof. Klein argues much for both its intrinsic merit and its widespread reception; for it is designed to fall within the scope of readers to whom the foreign language presents a greater difficulty than the subject-matter. The warm praise bestowed by Prof. Klein in his introductory notice renders criticism superfluous. He says, "ich kenne keines (Werk), welches den systematischen Aufbau dieser Disziplin in einer dem heutigen Stande der Wissenschaft entsprechenden Form in so durchsichtiger und gleichzeitig so vollständiger Weise darböte, wie das vorliegende. Dabei ist die Darstellung überall anschaulich und doch völlig streng. . ."

Probably the best known book on the subject is Reye's "Geometrie der Lage," and in the region where the two overlap the present volume is, speaking personally, much more readable. Reye, however, includes a large amount of solid geometry, reaching even Kummer's surface by synthetic methods, whereas Enriques devotes all but one chapter to plane geometry. He makes continual appeal to intuition, but at the same time skilfully bases his system on rigorous logical deductions from six axioms, without becoming tedious. Of the axioms, three deal with incidence, two with order, and the last is Dedekind's axiom of continuity.

Since cross ratio occupies so large a portion of the book, it is unfortunate that the notation is rather confusing; the elements should be named in the order in which they would actually occur if the range were harmonic. There is great practical convenience in doing this, and it is customary at least in this country.

An interesting feature of the book is the chapter on constructions with certain instruments. It is shown that all metrical problems of the first degree are soluble with the aid of a ruler when a square is given, and all problems soluble with ruler and compasses are soluble with a two-edged ruler alone. Certain problems of the third degree appear here for the first time in a text-book.

The volume concludes with a short historical account, which has been increased in the German edition.

The title of the series of three volumes by Herren Weber and Wellstein is possibly appropriate, but certainly misleading, as it suggests a comparison with the great "Encyklopädie der mathematischen Wissenschaften" which is in course of publication by the same firm; whereas there is no similarity, and the present work is written more from a pedagogic point of view than with the intention of supplying an exhaustive work of reference. One can imagine the

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book to be the outcome of a course of lectures to graduates intending to enter the teaching profession, in which Prof. Weber brings his long years' experience and profound knowledge to bear upon some of the subjects usually regarded as "elementary."

The first volume contains three parts, Grundlagen der Arithmetik, Algebra, Analysis. The remaining two volumes are to deal with geometry, and applications. The contents are what every teacher of elementary mathematics should know and not teach. The authors have found some difficulty in defining the range of subjects of discussion, but no limitation has been imposed upon the methods employed. The first few pages deal with aggregates, and later we come to the logical reasoning upon which the introduction of irrationals and of imaginaries is based. The part on algebra is chiefly concerned with theory of equations and theory of numbers, and the third part with infinite series and products, including the most important examples. Speaking generally, subjects of technical or practical interest are excluded, and only those presenting serious logical difficulties are discussed in detail.

The book is admirably printed and clearly arranged, and should prove a very useful and trustworthy companion to all who care for exact knowledge for its own sake. R. W. H. T. H.

OUR BOOK SHELF.

Stars and Sextants. By Sprigge, Doak, Hudson and Cox. With an introduction by Lord Ellenborough. Pp. xxv+55. (London: J. D. Potter, 1903.) Price 2*s*. 6*d*.

THIS book places in the hands of explorers, navigators, surveyors and others who use the sextant a simple means of finding its centring error. The centring error of a sextant at sea has hitherto been severely left alone on account of the somewhat tedious calculations necessary to find it.

The method of obtaining the total error (and hence the centring error by applying the index error) by observing the distance between two stars when on the same vertical circle is mentioned in "Hydrographical Surveying," by Sir William J. L. Wharton, in the second edition, 1898. The error thus obtained is owing to refraction not strictly accurate, unless the two stars are of equal altitudes at the time of observing. The best time for observing the distance between two stars, so that refraction may have the least possible effect and alter slowest with the time, is when the altitudes of the stars are equal. However, the error due to refraction in observing stars at different altitudes is not great when they are on the same vertical circle, and in finding the error of a sextant at sea it may be neglected, especially if the altitude of the lower star be above 30 degrees.

The centring error can only be found for different points on the arc of a sextant by taking a large number of observations for each point and meaning the results. It is to be hoped this book will induce many to take these observations, so that while learning the principal stars they may also become expert observers.

The book contains (1) ephemeris, 1904, with star pairs of nearly equal magnitude; (2) distances of star pairs; (3) ex-meridian star pairs, with distances for every ten days; (4) semi-diurnal arcs for finding the time a fictitious star rises and sets; (5) astronomical refraction corrected for barometer and thermometer; (6) notes on the stars. The descriptions and rules for using the tables are clear and simple, the figures are well arranged, and the type is very distinct. The temperature required for correcting the refraction should be taken by a Fahrenheit thermometer in a screen exposed to the open air.

This book might lead a tyro to suppose that correct time for obtaining errors and rating chronometers can only be obtained by equal altitudes of the sun, and only by a sextant of which the centring error is known; such is not the case. Time can be accurately obtained with a faulty sextant by observing sets of single altitudes both A.M. and P.M. of the sun, of stars both east and west of the meridian and meaning the results. By another less known but very valuable method the time is obtained in less than half an hour, if the stars are properly selected, by taking the equal altitudes of two different stars on opposite sides of the meridian.

Nothing must prevent the navigator from finding his position by stars. Take them at other times when possible, but *always* at twilight.

VANSITTART HOWARD.

Engine Tests and Boiler Efficiencies. By J. Buchetti. Pp. xv+255. (Westminster: Constable and Co., Ltd., 1903.) Price 10*s*. 6*d*. net.

THE volume before us is a translation, by Mr. Alexander Russell, of M. Buchetti's well-known work "Guide pour l'Essai des Moteurs." The object of the volume is to place before British and American engineers a record of Continental practice so as to render a comparison possible with home practice, and in order to further this comparison the measures and tables have been converted to English units.

The subject-matter is divided into nine chapters, and commences with well illustrated descriptions of the many indicators in use for testing steam and other engines. The important subject of mounting the indicator is then thoroughly dealt with, and this is as it should be, since the accuracy of the results depends entirely on the fitting and the scientific arrangement of the gear; M. Buchetti appears to have taken infinite pains to treat these details very thoroughly—there are many evidences of this right through the book.

The same can be said of the treatment of the several types of brakes now in use. When dealing with properties of steam, we note on p. 180 one or two clerical errors under the paragraph on saturated steam. The author talks about "If we compress the piston," &c., and further on in the next paragraph he says, "When the piston is allowed to expand"; surely the word piston should read "saturated steam" or "steam"?

The brief chapter on the testing of steam turbines by the Hon. C. A. Parsons, F.R.S., is all too short; we should have welcomed more interesting details from the pen of this able experimenter and engineer.

Taken as a whole, however, this book is full of interest. Students of steam and engineering should lose no time in obtaining a copy, since its contents are of the highest value to them. N. J. L.

An English Grammar. By the Rev. S. Claude Tickell, A.K.C. Pp. 60. (London: O. Newmann and Co.) Price 2*s*.

THIS pamphlet of sixty pages is very unlike what is ordinarily understood by an English grammar. It opens with a paragraph of three lines headed "Analysis and Parsing Differentiated." Then comes

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